AMENDMENTS TO THE CLAIMS

The text of all pending claims, including withdrawn claims, is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please CANCEL claims 5 and 15 without prejudice or disclaimer, AMEND claims 1 and 8- 14, and ADD new claims 16-21 in accordance with the following:

1. (Currently Amended) A service distribution device for distributing specified services among a plurality of servers in which there is a difference in processing capacity on a network to balance the server loads, comprising:

a packet capture device capturing packets transmitted through the network to calculate the server processing time and parameters to configure simulation models;

a server identifier recording information pertaining to the captured packets into a server log for each server;

a service identifier recording information pertaining to the captured packets into a service log for each service;

a server modeling module setting up a simulation model for each server from the server log;

a service modeling module setting up a simulation model for each service from the service log;

a simulator reading in the server model and the service model and running each simulation; and

a server selection module selecting and specifying an optimum server to distribute services to based on a simulator result,

wherein said simulator performs a simulation using the server model and the service model and generates a mean value or a median value of a session time for the specific service.

2. (Original) The service distribution device of claim 1, further comprising a packet relay device obtaining packets using a packet capture module mounted on said packet relay device, which relays packets between a client and the servers.

3. (Previously Presented) A service distribution device for distributing specified services among a plurality of servers in which there is a difference in processing capacity on a network to balance the server loads, comprising:

a packet capture device capturing packets transmitted through the network to calculate the server processing time and parameters to configure simulation models;

a server identifier recording information pertaining to the captured packets into a server log for each server;

a service identifier recording information pertaining to the captured packets into a service log for each service;

a server modeling module setting up a simulation model for each server from the server log;

a service modeling module setting up a simulation model for each service from the service log;

a simulator reading in the server model and the service model and running each simulation; and

a server selection module selecting and specifying an optimum server to distribute services to based on a simulator result,

wherein said server modeling module constructs a server model having a queue corresponding to a transmission process using the server log and a server transmission throughput, a server processing time, and a unit processing time as parameters,

wherein the server transmission throughput is calculated from a total size L of an arbitrary, continuous string of the continuously transmitted packets using the formula L / (t-e – t-s) where t-e is an ending packet capture time and t-s is a starting packet capture time, and

wherein the server processing time is calculated using the formula (ts – tc) – (ls + lc) / B, wherein ts and ls are the capture time and size of a server response packet, respectively, tc and lc are the capture time and size of a corresponding client response packet, respectively, and B is a network speed.

4. (Previously Presented) A service distribution device for distributing specified services among a plurality of servers in which there is a difference in processing capacity on a network to balance the server loads, comprising:

a packet capture device capturing packets transmitted through the network to calculate the server processing time and parameters to configure simulation models;

a server identifier recording information pertaining to the captured packets into a server

log for each server;

a service identifier recording information pertaining to the captured packets into a service log for each service;

a server modeling module setting up a simulation model for each server from the server log;

a service modeling module setting up a simulation model for each service from the service log,

wherein said service modeling module calculates the following parameters from the service log by constructing a service model for each service:

a ratio of the number of sessions for each service to the number of sessions for all services,

a session starting frequency or time interval,

a number of transmissions between the client and server per session,

a client response size, packet size, and packet count per transmission,

a server response size, packet size, and packet count per transmission, and

a time from the server response until the client response;

a simulator reading in the server model and the service model and running each simulation; and

a server selection module selecting and specifying an optimum server to distribute services to based on a simulator result.

5. (Cancelled)

6. (Original) The service distribution device of claim 1, wherein said server selection module determines a standard value using an output of a single simulation run for each service by said simulator, and determines that a high load state exists if a difference between, or the ratio of, the standard value and the output of the simulation of a plurality of sessions exceeds a pre-determined threshold.

7. (Original) The service distribution device of claim 6, wherein when said server selection module receives a server distribution query, said server selection module sets a server permission to be a starting frequency of the session that will cause a high load state for the service in question for each server, and specifies a server having the biggest difference between the session starting frequency and the permission as a server for distribution.

8. (Currently Amended) A service distribution device for distributing services among a plurality of servers on a network to balance the server loads, comprising:

a packet capture device capturing packets transmitted through the network;

a server identifier recording information pertaining to the captured packets into a server log for each server;

a service identifier recording information pertaining to the captured packets into a service log for each service;

a server modeling module setting up a simulation model for each server from the server log;

a ~~server~~ service modeling module setting up a simulation model for each service from the service log;

a simulator reading in the server model and the service model and running each simulation; and

a server selection module selecting and specifying an optimum server to distribute services to based on a simulator result,

wherein said server selection module determines a standard value using an output of a single simulation run for each service by said simulator, and determines that a high load state exists if a difference between, or the ratio of, the standard value and the output of the simulation of a plurality of sessions exceeds a pre-determined threshold, ~~and~~

wherein when said server selection module receives a distribution server query, said server selection module runs a simulation for a service in question for each server and specifies a server for which a result of a ratio for which β multiplied by the standard value is less than or equal to γ, and

wherein β is a ratio of the threshold to the standard value, and γ is a ratio of a number of overloaded cases to a total number of cases.

9. (Currently Amended) A service distribution device for distributing services among a plurality of servers on a network to balance the server loads, comprising:

a packet capture device capturing packets transmitted through the network;

a server identifier recording information pertaining to the captured packets into a server log for each server;

a service identifier recording information pertaining to the captured packets into a service log for each service;

a server modeling module setting up a simulation model for each server from the server log;

a ~~server~~ service modeling module setting up a simulation model for each service from the service log;

a simulator reading in the server model and the service model and running each simulation; and

a server selection module selecting and specifying an optimum server to distribute services to based on a simulator result,

wherein said server selection module determines a standard value using an output of a single simulation run for each service by said simulator, and determines that a high load state exists if a difference between, or the ratio of, the standard value and the output of the simulation of a plurality of sessions exceeds a pre-determined threshold, ~~and~~

wherein when said server selection module receives a distribution server query, said server selection module runs a simulation for a service in question for each server and specifies as a distribution server, a server for which a result of ratio for which β multiplied by the standard value is smallest, and

wherein β is a ratio of the threshold to the standard value.

10. (Currently Amended) A service distribution device for distributing services among a plurality of servers on a network to balance the server loads, comprising:

a packet capture device capturing packets transmitted through the network;

a server identifier recording information pertaining to the captured packets into a server log for each server;

a service identifier recording information pertaining to the captured packets into a service log for each service;

a ~~service~~ server modeling module setting up a simulation model for each server from the server log;

a service modeling module setting up a simulation model for each service from the service log;

a simulator reading in the server model and the service model and running each simulation; and

a server selection module selecting and specifying an optimum server to distribute services to based on a simulator result,

wherein said service modeling module calculates the following parameters from the

service log by constructing a service model for each service

a ratio of the number of sessions for each service to the number of sessions for all services,

a session starting frequency or time interval,

a number of transmissions between the client and server per session,

a client response size, packet size, and packet count per transmission,

a server response size, packet size, and packet count per transmission, and

a time from the server response until the client response, and

wherein said service modeling module categorizes each session transmission as a connection request from a client and a response from a server in response to the connection request, and a command transmission, a data transmission, a response occurring after establishing a connection between a server and a client, and an end, and calculates the parameters for each session transmission based upon category.

11. (Currently Amended) A service distribution device for distributing services among a plurality of servers on a network to balance the server loads, comprising:

a packet capture device capturing packets transmitted through the network;

a server identifier recording information pertaining to the captured packets into a server log for each server;

a service identifier recording information pertaining to the captured packets into a service log for each service;

a server modeling module setting up a simulation model for each server from the server log;

a ~~server~~ service modeling module setting up a simulation model for each service from the service log;

a simulator reading in the server model and the service model and running each simulation; and

a server selection module selecting and specifying an optimum server to distribute services to based on a simulator result,

wherein said server selection module determines a standard value using an output of a single simulation run for each service by said simulator, and determines that a high load state exists if a difference between, or the ratio of, the standard value and the output of the simulation of a plurality of sessions exceeds a pre-determined threshold, ~~and~~

wherein when said server selection module receives a server distribution query, said

server selection module sets a server permission to be a starting frequency of the session that will cause a high load state for the service in question for each server, and specifies a server having the biggest difference between the session starting frequency and the permission as a server for distribution, and

wherein the permissions of each of the servers are taken as weighted values of a service distribution, or relative ratios of the permissions are taken as server distribution ratios.

12. (Currently Amended) A service distribution device for distributing specified services among a plurality of servers in which there is a difference in processing capacity to balance server loads, comprising:

a server modeling module generating a simulation model for each server and a service modeling module generating a simulation model for each service based on a server log and a service log of captured server communication;

a simulator reading the server models and the service models and running a plurality of simulations; and

a server selection module determining which servers have low loads based on results of the simulations and selecting the servers with low loads to receive the services,

wherein said simulator performs a simulation using the server model and the service model and generates a mean value or a median value of a session time for the specific service.

13. (Currently Amended) A method for distributing specified services among a plurality of servers in which there is a difference in processing capacity to balance server loads, comprising:

generating a simulation model for each server and each service based on a server log and a service log of captured server communication;

running a plurality of simulations using the server and service models; ~~and~~

determining which servers have low loads based on results of the simulations and selecting the servers with low loads to receive the services; and

performing a simulation using the server model and the service model and generating a mean value or a median value of a session time for the specific service.

14. (Currently Amended) A computer-readable storage controlling a computer to distribute services among a plurality of servers in which there is a difference in processing

capacity and comprising a process of:

generating a simulation model for each server and each of a plurality of services based on a server log and a service log of captured server communication;

running a plurality of simulations using the server and service models; ~~and~~

determining which servers have low loads based on results of the simulations and selecting the servers with low loads to receive the services; and

performing a simulation using the server model and the service model and generating a mean value or a median value of a session time for the specific service.

15. (Cancelled)

16. (New) A service distribution device according to claim 1,

wherein said server modeling module constructs a server model having a queue corresponding to a transmission process using the server log and a server transmission throughput, a server processing time, and a unit processing time as parameters,

wherein the server transmission throughput is calculated from a total size L of an arbitrary, continuous string of the continuously transmitted packets using the formula L / (t-e – t-s) where t-e is an ending packet capture time and t-s is a starting packet capture time, and

wherein the server processing time is calculated using the formula (ts – tc) – (ls + lc) / B, wherein ts and ls are the capture time and size of a server response packet, respectively, tc and lc are the capture time and size of a corresponding client response packet, respectively, and B is a network speed.

17. (New) A service distribution device according to claim 1,

wherein said service modeling module calculates the following parameters from the service log by constructing a service model for each service:

a ratio of the number of sessions for each service to the number of sessions for all services,

a session starting frequency or time interval,

a number of transmissions between the client and server per session,

a client response size, packet size, and packet count per transmission,

a server response size, packet size, and packet count per transmission, and

a time from the server response until the client response.

18. (New) A service distribution device according to claim 1,

wherein said server selection module determines a standard value using an output of a single simulation run for each service by said simulator, and determines that a high load state exists if a difference between, or the ratio of, the standard value and the output of the simulation of a plurality of sessions exceeds a pre-determined threshold,

wherein when said server selection module receives a distribution server query, said server selection module runs a simulation for a service in question for each server and specifies a server for which a result of a ratio for which β multiplied by the standard value is less than or equal to γ,

wherein β is a ratio of the threshold to the standard value, and γ is a ratio of a number of overloaded cases to a total number of cases.

19. (New) A service distribution device according to claim 1,

wherein said server selection module determines a standard value using an output of a single simulation run for each service by said simulator, and determines that a high load state exists if a difference between, or the ratio of, the standard value and the output of the simulation of a plurality of sessions exceeds a pre-determined threshold,

wherein when said server selection module receives a distribution server query, said server selection module runs a simulation for a service in question for each server and specifies as a distribution server, a server for which a result of ratio for which β multiplied by the standard value is smallest, and

wherein β is a ratio of the threshold to the standard value.

20. (New) A server distribution device according to claim 1,

wherein said service modeling module calculates the following parameters from the service log by constructing a service model for each service:

a ratio of the number of sessions for each service to the number of sessions for all services,

a session starting frequency or time interval,

a number of transmissions between the client and server per session,

a client response size, packet size, and packet count per transmission,

a server response size, packet size, and packet count per transmission, and

a time from the server response until the client response, and

wherein said service modeling module categorizes each session transmission as a connection request from a client and a response from a server in response to the connection request, and a command transmission, a data transmission, a response occurring after establishing a connection between a server and a client, and an end, and calculates the parameters for each session transmission based upon category.

21. (New) A service distribution device according to claim 1,

wherein said server selection module determines a standard value using an output of a single simulation run for each service by said simulator, and determines that a high load state exists if a difference between, or the ratio of, the standard value and the output of the simulation of a plurality of sessions exceeds a pre-determined threshold,

wherein when said server selection module receives a server distribution query, said server selection module sets a server permission to be a starting frequency of the session that will cause a high load state for the service in question for each server, and specifies a server having the biggest difference between the session starting frequency and the permission as a server for distribution, and

wherein the permissions of each of the servers are taken as weighted values of a service distribution, or relative ratios of the permissions are taken as server distribution ratios.